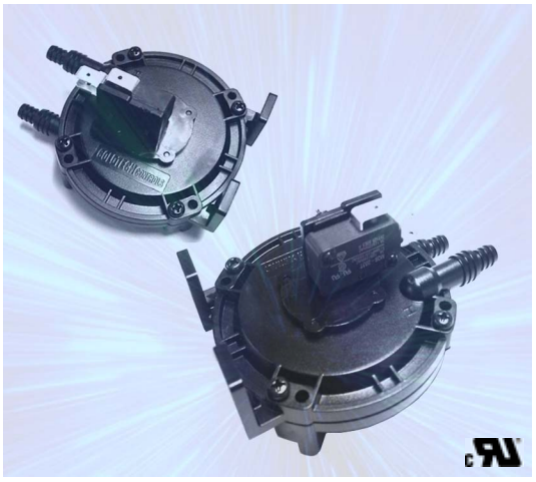
USER MANUAL



APPLICATION

The PS-100/PS-110 series differential air pressure switch is designed to be used on air or combustion products such as boilers, furnaces and other HVAC equipments functions as airflow and air pressure supervision.

Featured with factory fixed set-point or field adjustable set-point versions, these switches can be used to sense positive, negative or differential air pressure. A highly reliable micro-switch is used as the power switching element which offers minimum 100,000 cycles under rated load..

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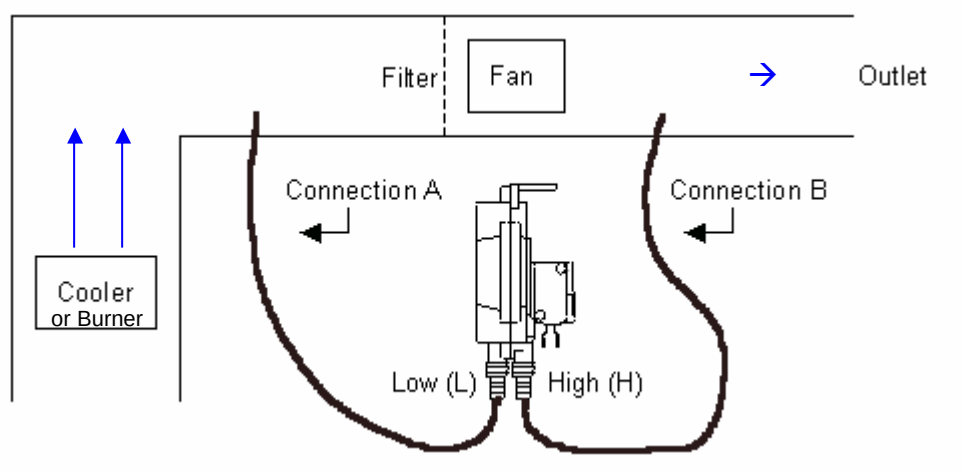
FEATURES

- Suitable for positive, negative and differential pressure applications.
- PS-100/110 series switches can be used up to 105 °C.
- Can be used with air or combustion products.
- Pressure set point can be factory fixed (PS-100) or field adjustable (PS-110).
- Diaphragm responds to pressure changes as low as 25 Pa.
- Snap action switch UL1054 & VDE approved with life cycles > 100,000 cycles at rated load.
- Various types of quick connect terminals are available.
- Flexible connector orientation, mounting position and mounting holes are available.
- Various optional mounting brackets are available for easy installation.

WORKING PRINCIPAL & EXAMPLE

Consider a typical HVAC system as an example.



When the fan operates properly and the filter is not blocked, the pressure of the air released from the fan is larger than atmosphere pressure and that intake to the fan is lower than atmosphere pressure.

In this system, a pressure switch is used for:

1. Energy saving. When there is no air flow in the air passage, the appliance will be switched off.
2. When abnormal combustion would result from a reduced air-flow rate (thus pressure drop), the appliance must either not start up or shut down if it is already in operation.
3. Appliance must stop if the air inlet or outlet becomes restricted or blocked which may result a dangerous situation.

Positive sensing

- Remove Connection A, use Connection-B only.
- The pressure switch senses a high pressure from inlet H and the atmosphere pressure from inlet L respectively.
- As long as the pressure difference is high enough, the switch will be actuated.

Negative sensing

- Remove Connection-B, use Connection-A only.
- The pressure switch senses a low pressure from inlet L and the atmosphere pressure from inlet H respectively.
- As long as the pressure difference is high enough, the switch will be actuated.

Differential sensing

- Use both Connection-A and Connection-B as shown in the circuit above.
- The pressure switch senses a high pressure from inlet H and a low pressure from inlet L respectively.
- As long as the pressure difference is high enough, the switch will be actuated.

SPECIFICATIONS & CHARACTERICS

All specifications and characteristics in this User Manual refer to vertical installation. For the applications that require horizontal installation, the operation set point shifts as indicated in Page 8.

Set Point

PS-100: 0.1 to 5.0" H_2O (0.25 ~ 12.5 mbar)
Factory Fixed set-point

PS-112: 0.2 to 1.0" H_2O (0.50 ~ 2.50 mbar)
Field Adjustable Set-point

PS-113: 1.0 to 5.0" H_2O (2.5 ~ 12.5 mbar)
Field Adjustable Set-point

Maximum Pressure Allowed

1 P.S.I

Switch Rating

5 A resistive @ 120 ~ 277 VAC
0.1 A resistive @ 120 ~ 277 VAC
1/10 hp @ 120 ~ 277 VAC
1 A pilot duty @ 120 VAC
28 VA pilot duty @ 24VAC

Switching Element

Snap-action switch

Contact Arrangement

SPDT, SPST-NO, SPST-NC

Measured Media

Air
Combustion products

Operating Temperature

-40 to 105 °C

Sample Line Connectors

Barbed fittings will accept 1/4" or 3/8" ID flexible slip on tubing
Custom-made design is available

Mounting

Vertical
Horizontal (optional)

Material

Diaphragm: Silicon
Plastic Housing: PPO
Optional Bracket: Brass/Steel

Terminals

250 (6.3 x 0.8 mm) Quick connect
187(4.8 x 0.5 mm) Quick connect
Screw Terminals
Soldering Terminals

Relative humidity

5% to 95% relative humidity at 40 °C

Factory Fixed Set-points Range & Accuracy

Pressure range	Setting ON Accuracy	Setting ON Accuracy (%)	Setting OFF Accuracy	Setting OFF Accuracy (%)
0.10" ~ 0.32" w.c	± 0.04" w.c	–	± 0.04" w.c	–
0.32" ~ 1.00" w.c	± 0.05" w.c	–	± 0.05" w.c	–
1.00" ~ 5.00" w.c	–	10%	–	10%

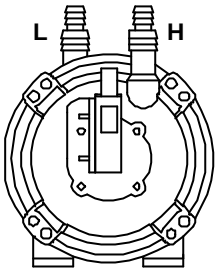
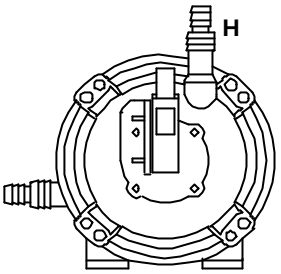
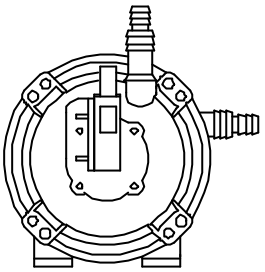
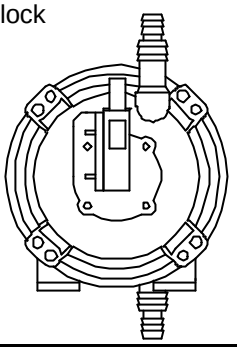
Field Adjustable Set-point Model, Range & Accuracy

Model	Set point range	Set point increase per turn	Initial set point (at factory)	Tolerance
PS-112	0.20 – 1.0" w.c.	0.16" w.c.	0.20" w.c.	± 0.08" w.c.
PS-113	1.0 – 5.0" w.c.	0.80" w.c.	1.0" w.c.	± 10%

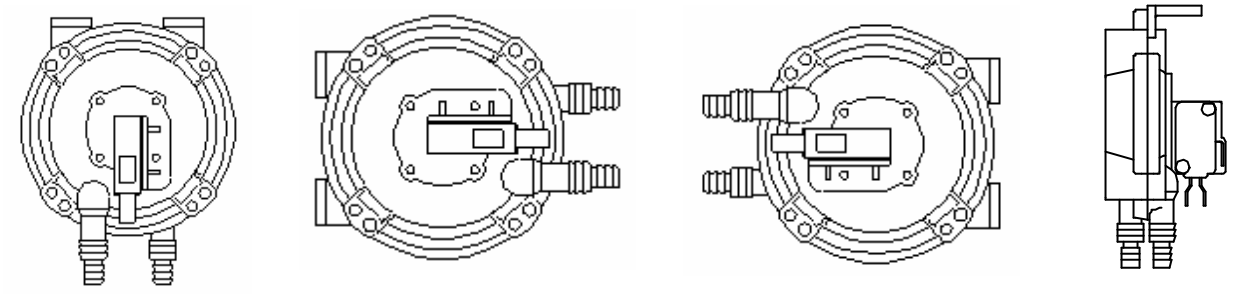
Recommendation:

The set-point values for your application shall be determined by measuring the pressure differential where the pressure switch will be connected. The set-points of the pressure switch must be determined by measuring the pressure differential *on the position* where the pressure switch is to be installed.

CONNECTORS POSITIONS

Type 1: Twelve o'clock 	Type 2: Nine o' clock 
Type 3: Three o' clock 	Type 4: Six o' clock 

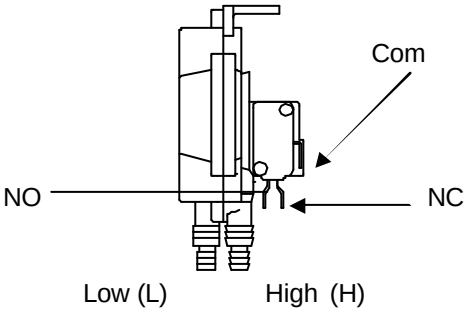
RECOMMENDED CONNECTORS ORIENTATION



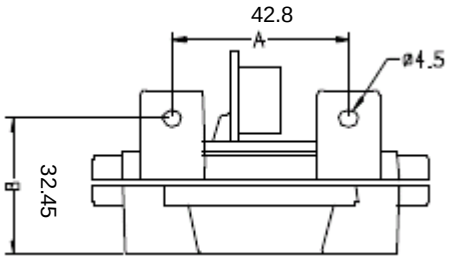
Remarks:

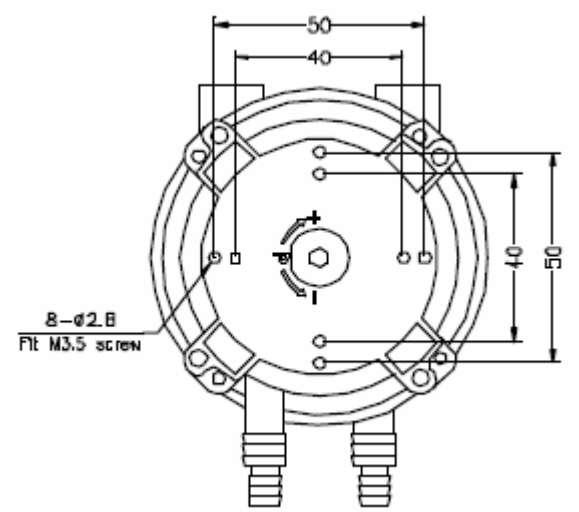
1. All recommended installation positions are with the diaphragm *vertical*.
2. Connector in upward position is *not* recommended to avoid water vapor condensation penetrating into the pressure switch.

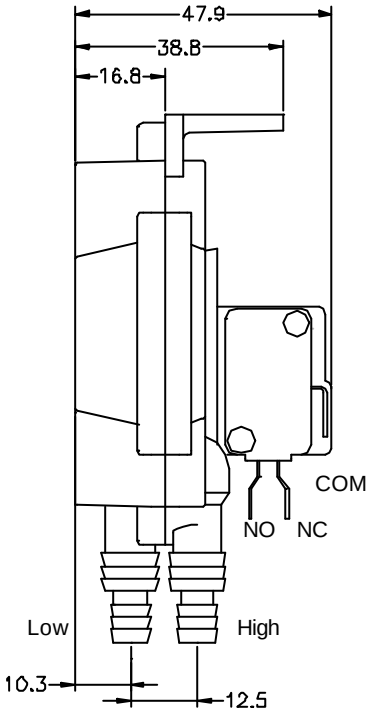
AIR SAMPLING CONNECTIONS

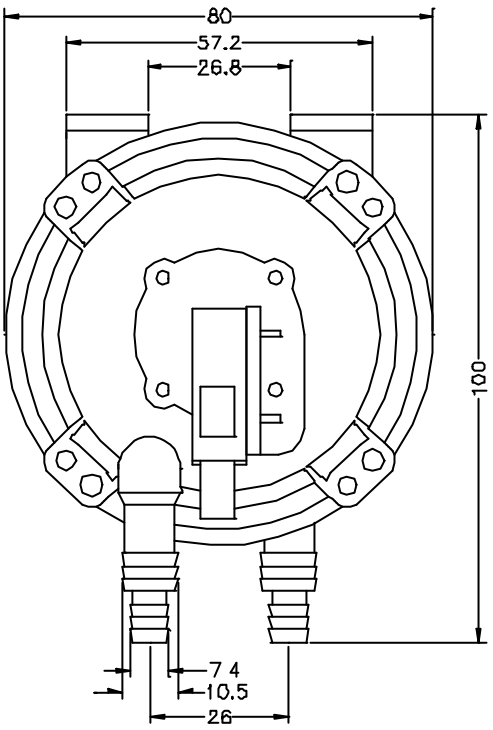


DIMENSIONAL DRAWING & MOUNTING HOLES



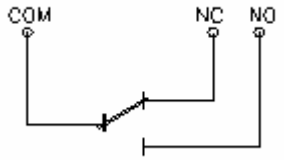






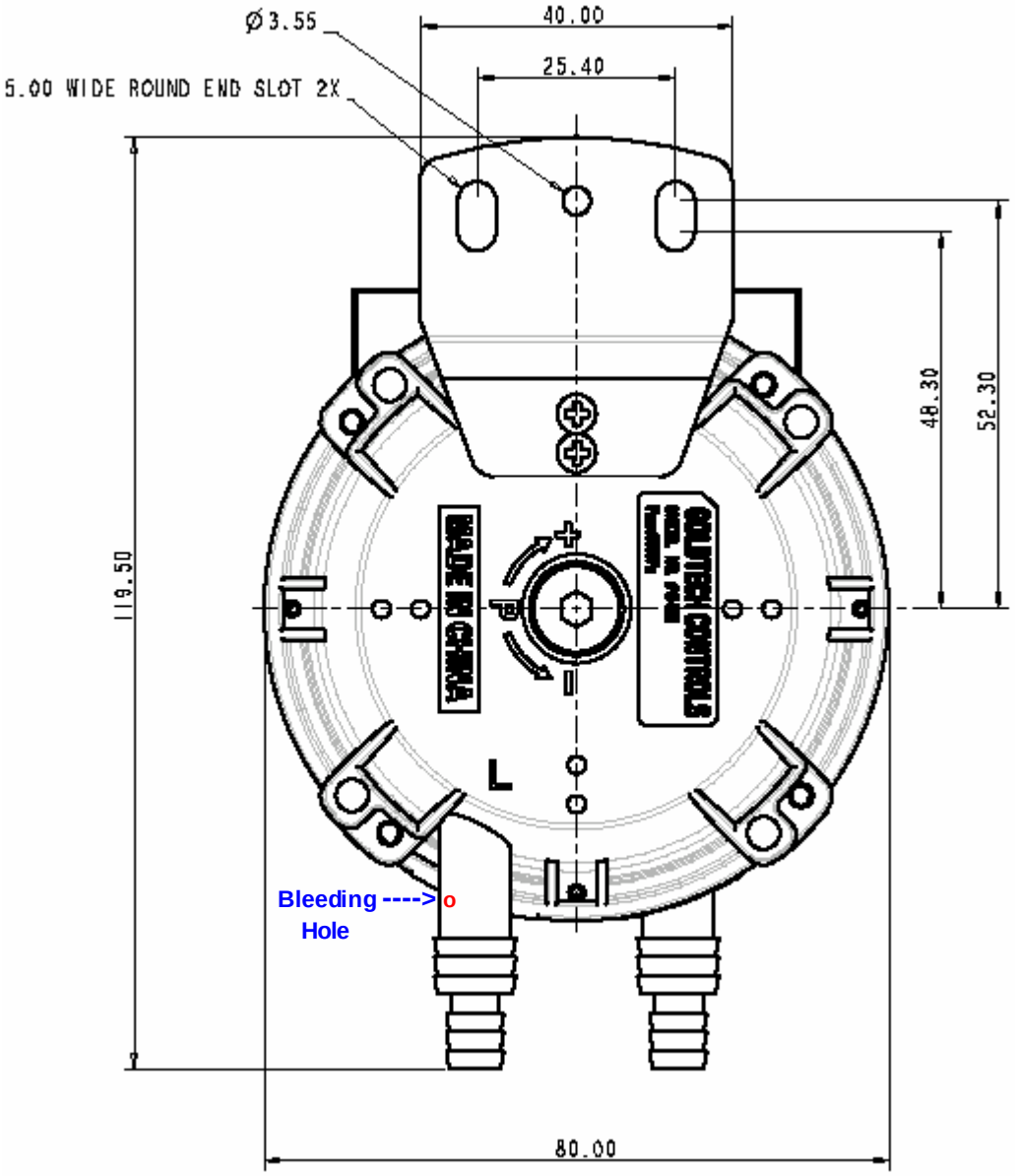
CIRCUIT CONNECTIONS

- Without pressure applied to the diaphragm, switch contacts are in the position shown.
- Pressure switch can come with SPDT, SPST-NO or SPST-NC circuit arrangement.



OPTIONAL MOUNTING BRACKET

Different standard mounting brackets are available for quick installation. Customers can also tool up their own bracket design at low cost through our own tooling shop. Please contact Goldtech or your local sales representatives for details.



OPTIONAL BLEEDING HOLES

Optional bleeding holes of 0.4mm or 0.5mm in diameter can be drilled in the Low or High sampling connection as shown in above drawing. Bleeding hole is *not* drilled by default but is available on demand. It bleeds off pressure slowly during normal operation in some systems to prevent air (e.g. non-stopping exhausted air) from being trapped inside the switch chamber.

Typical Example: when the pressure switch is used to sense pulse pressure in a HVAC system.

Caution: if a bleeding hole is built, make sure the pressure switch is installed with the bleeding hole at the bottom such that it is not blocked during installation and in normal operation.

INSTALLATION & APPLICATION SAFETY

When installing this product:

- Make sure the installation process is performed by trained technicians or engineers.
- Follow all appliance instructions carefully. Failure to follow the instructions could damage the product or cause a hazardous condition.
- Check that this product has the required pressure and electrical rating for the application.
- On completing the installation, check that all components operate correctly.
- When it is used as the primary safety control of your system, it must be part of a safe start circuit. A safe start check circuit will not allow the system (e.g. burner) to operate unless the pressure switch contacts are in the correct position before the operating cycle begins. This ensures the pressure switch and the control circuit are both operating properly.

INSTALLATION LOCATION

- Combustion products usually contain a large quantity of vapor. As it cools, condensation generated within the switch body and the tubing can shift the pressure set-points.
- Mount the pressure switch with the pressure connectors at the bottom so that condensate does not flow or penetrate into the switch.
- The switch should be placed in a position higher than the connecting tubes and the condensate drainage. This prevents any liquid flow into the switch and affects the normal operation.
- The surrounding temperature of the switch could not be higher than 105°C.
- Make sure the connection tube you use is able to sustain high temperature.
- Select a position such that convenient connection of the pressure tubing and electrical wiring is allowed.
- The pressure switch shall not be installed in a location where it is subjected to severe vibrating which may change the pressure switch set-points.

PIPING CONNECTION TUBE

- The outer diameter of the sensing connector is 7.4 mm or 10.5mm. Please refer to drawings in Page 5.
- Connection pipe' s inner diameter should be 1.5mm(approx.) less than the connector' s outer diameter.
- Plastic or rubber tube is recommended. Make sure it is able to sustain the highest operating temperature of your system.
- When selecting a tube, make sure that it is sufficient pull strength (independent ambient temperature changes).
- Use gradual turns in the piping route and avoid sharp bends to ensure correct pressure sensing.

WIRING

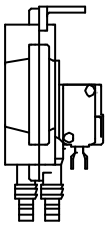
- Disconnect power supply before making any wiring connections.
- All wiring must be followed with the local regulations.
- When making connections to the switch terminals (especially for quick connect terminal), do not force the switch upward or downward to bend the terminals. This will affect the pressure set-point.
- Prevent the terminals from contacting any liquid or exposed in a high humid location.

MOUNTING METHODS

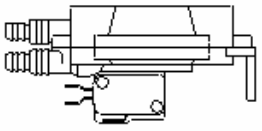
- The pressure switch should be installed with the diaphragm vertical.
- When the pressure switch is mounted with the diaphragm horizontal, the weight of the membrane will affect the set point of the switch.
- Use only the holes provided or the optional mounting bracket for mounting purpose. Do not drill holes for mounting purpose, as this would damage the switch.

Pressure Switch Orientation	ON Offset	OFF Offset
Default Orientation: Diaphragm vertical	0 mbar	0 mbar
a) Horizontal; micro-switch upper position	a) - 0.26 mbar	a) - 0.26 mbar
b) Horizontal: micro-switch lower position	b) + 0.26 mbar	b) + 0.26 mbar

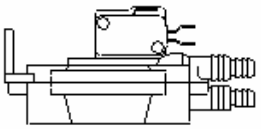
Switch Orientation	Set point accuracy					
	0.25 to 0.80 mbar		0.80 to 2.50 mbar		2.50 to 12.50mbar	
	ON	OFF	ON	OFF	ON	OFF
Vertical	± 0.10 mbar	± 0.10 mbar	± 0.13 mbar	± 0.13 mbar	± 10%	± 10%
Horizontal	± 0.14 mbar	± 0.14 mbar	± 0.17 mbar	± 0.17 mbar	± 10%	± 10%



Position #1



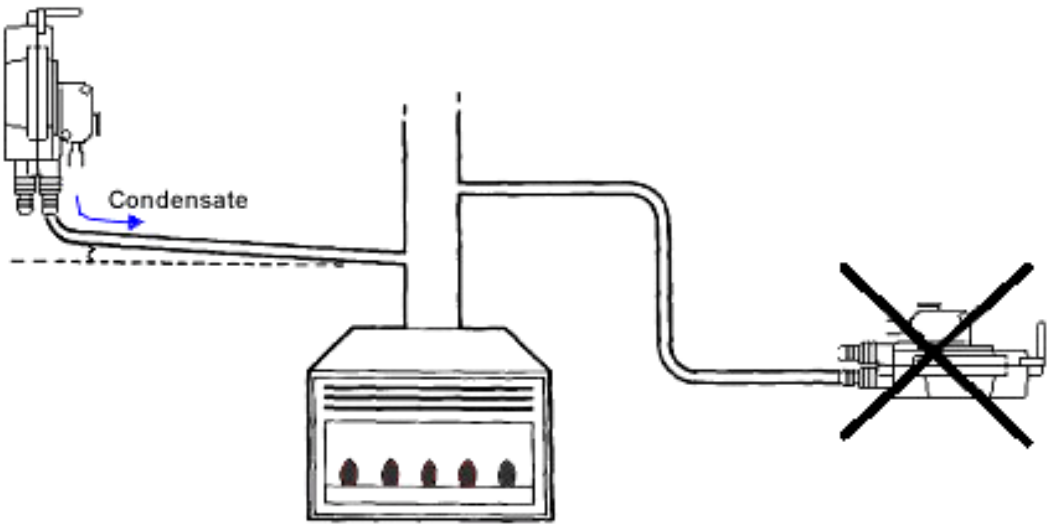
Position #2



Position #3

Position #1: Diaphragm vertical
Position #2: Diaphragm horizontal, micro-switch is in lower position
Position #3: Diaphragm horizontal, micro-switch is in upper position

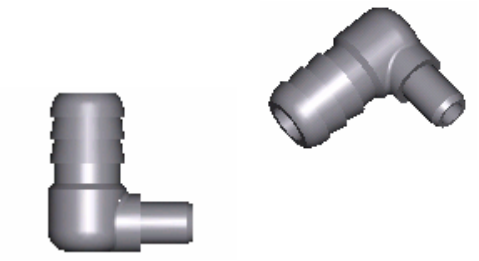
Example: Installation Position & Condensate Drainage



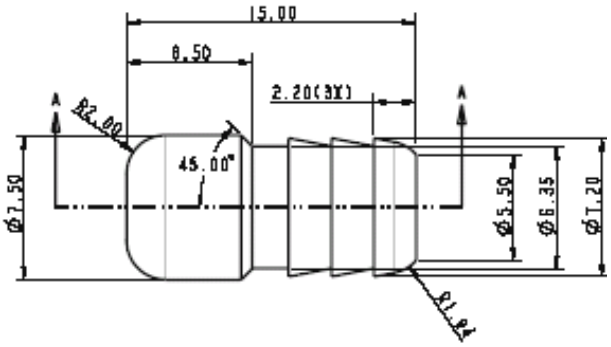
ACCESSORIES

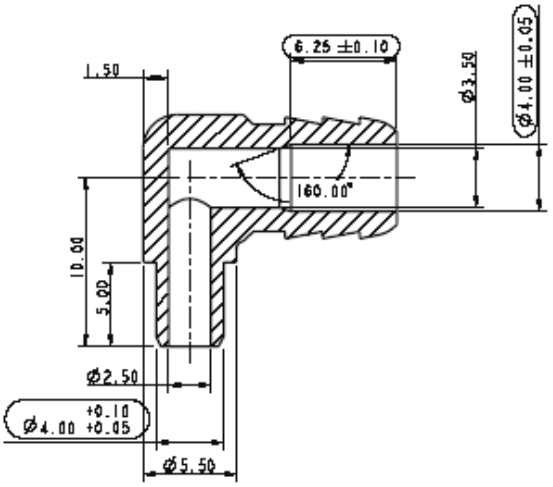
1. Elbow

Function
The elbow is used to change the inlet direction. Tubing can then be connected to the connector with different directions.



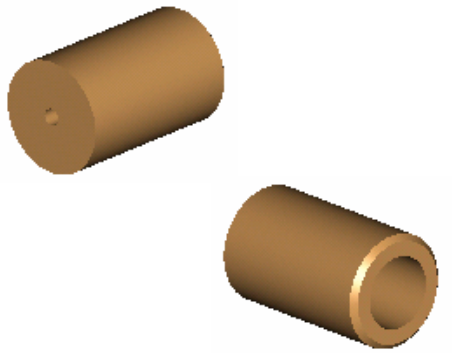
Installation
Insert the smooth-end of the elbow to the connector with the desired angle directly.





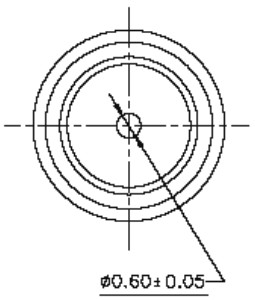
2. Restrictor

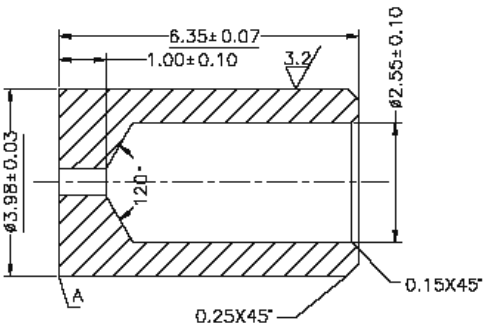
Function
The restrictor is used to prevent the air shock rushing to the diaphragm, which affects the normal operation of the pressure switch. The restrictor prevents this effect by limiting the excess air flowing into the switch.



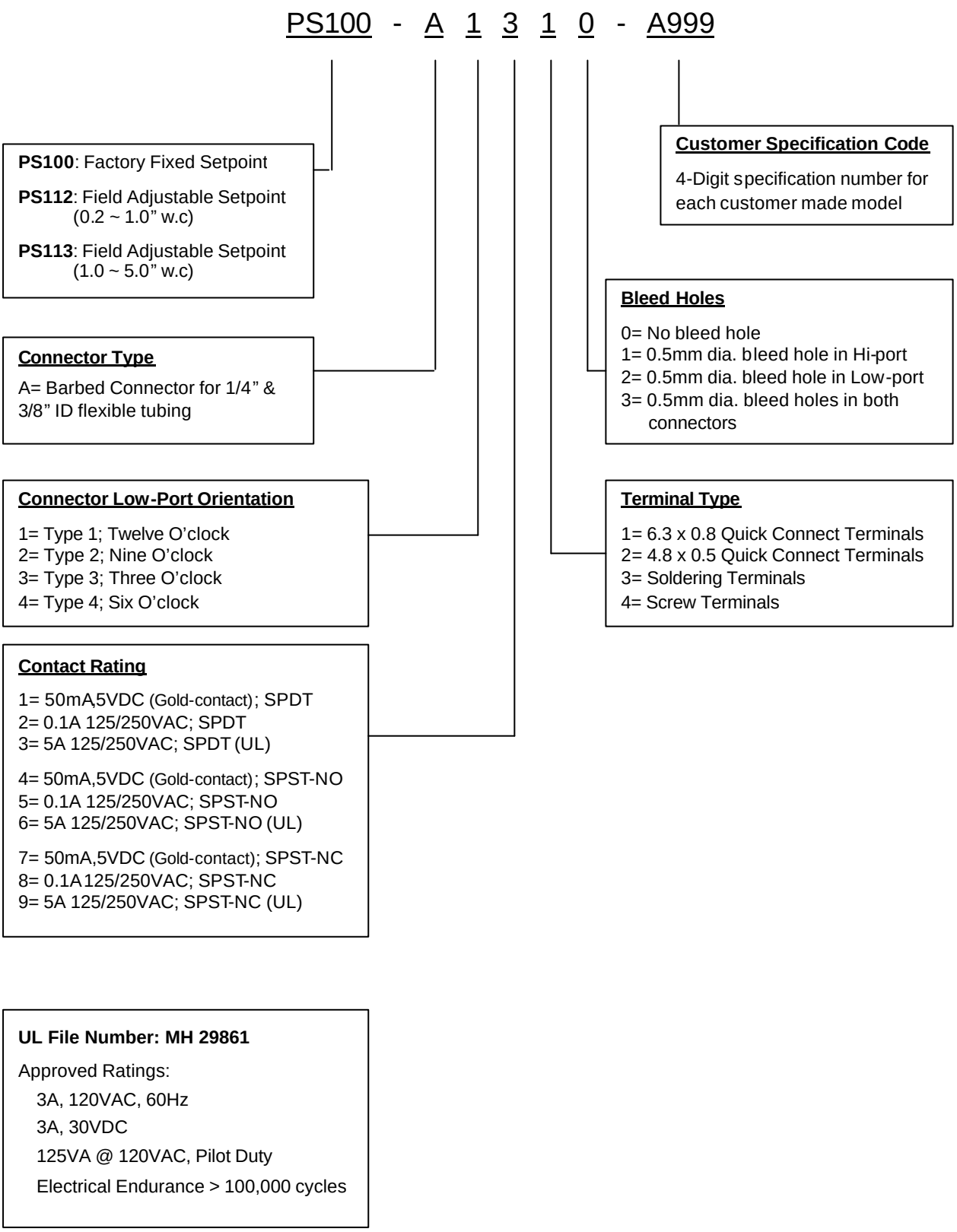
Installation
Insert the restrictor in the connector directly. The smaller hole of the restrictor is placed in an inner position.

Note
The restrictor is difficult to take out once it is inserted into the connector.





ORDERING INFORMATION


PS100 - A 1 3 1 0 - A999
PS100: Factory Fixed Setpoint
PS112: Field Adjustable Setpoint (0.2 ~ 1.0" w.c)
PS113: Field Adjustable Setpoint (1.0 ~ 5.0" w.c)
Connector Type
A= Barbed Connector for 1/4" & 3/8" ID flexible tubing
Connector Low-Port Orientation
1= Type 1; Twelve O'clock
2= Type 2; Nine O'clock
3= Type 3; Three O'clock
4= Type 4; Six O'clock
Contact Rating
1= 50mA,5VDC (Gold-contact); SPDT
2= 0.1A 125/250VAC; SPDT
3= 5A 125/250VAC; SPDT (UL)
4= 50mA,5VDC (Gold-contact); SPST-NO
5= 0.1A 125/250VAC; SPST-NO
6= 5A 125/250VAC; SPST-NO (UL)
7= 50mA,5VDC (Gold-contact); SPST-NC
8= 0.1A 125/250VAC; SPST-NC
9= 5A 125/250VAC; SPST-NC (UL)
Customer Specification Code
4-Digit specification number for each customer made model
Bleed Holes
0= No bleed hole
1= 0.5mm dia. bleed hole in Hi-port
2= 0.5mm dia. bleed hole in Low-port
3= 0.5mm dia. bleed holes in both connectors
Terminal Type
1= 6.3 x 0.8 Quick Connect Terminals
2= 4.8 x 0.5 Quick Connect Terminals
3= Soldering Terminals
4= Screw Terminals

UL File Number: MH 29861

Approved Ratings:

3A, 120VAC, 60Hz

3A, 30VDC

125VA @ 120VAC, Pilot Duty

Electrical Endurance > 100,000 cycles

Pressure Conversion Table

	PSI	In H_20	In Hg	kPa	mbar	cm H_20	mm H_20	mm Hg	k/cm^2	Atm
1 PSI	1.0000	27.6806	2.0360	6.8948	68.9475	70.3088	703.0700	51.7149	0.0703	0.0681
1 In H_20	0.0361	1.0000	0.0736	0.2491	2.4908	2.5400	25.4000	1.8683	0.0025	0.0025
1 In Hg	0.4912	13.5945	1.0000	3.3864	33.8638	34.5324	345.3240	25.4000	0.0345	0.3342
1 kPa	0.1450	4.0147	0.2953	1.0000	10.0000	10.1974	101.9716	7.5006	0.0102	0.0099
1 mbar	0.0145	0.4015	0.0295	0.1000	1.0000	1.0197	10.1972	0.7501	0.0010	0.0010
1 cm H_20	0.0142	0.3937	0.0290	0.0981	0.9806	1.0000	10.0000	0.7355	.0010	0.0010
1 mm H_20	0.0014	0.0394	0.0029	0.0098	0.0981	0.1000	1.0000	0.0736	0.0001	0.0001
1 mm Hg	0.0193	0.5353	0.0394	0.1333	1.3332	1.3595	13.5954	1.0000	0.0014	0.0013
1 kp/cm^2	14.2233	393.7110	28.9589	98.0665	980.6650	1000.0200	10000.20	735.5610	1.0000	0.9678
1 atm	14.6959	406.7930	29.9213	101.3250	1013.2500	1033.2500	10332.50	760.0020	1.0332	1.0000

For example: 1 mbar = 10.1972 mm H_2O

1 PSI = 27.6806 In H_2O

1 In H_2O = 0.2491 kPa

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